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Indian Standard

SPECIFICATION FOR ELASTIC TAPE

UDC 677·754:677·55

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 1981

AMENDMENT NO. 1 DECEMBER 1983
TO
IS:9686-1980 SPECIFICATION FOR ELASTIC TAPE

Alterations

[*Page 3, clause 2.1*(b)] - Substitute the following for the existing item (b):

'b) *Textile yarn* - From good quality cotton, rayon, nylon or any other suitable synthetic or blended fibre. It shall be bleached white or dyed to the required shade, as stipulated in the contract or order. Sulphur dyes shall not be used.'

(*Page 4, clause 4.5, informal table*) - Substitute the following for the existing informal table:

Colour Fastness to	*Requirement*	*Method of Test*
a) Light	4 or better	IS:2454-1967*
b) Washing	4 or better	IS:3361-1979†

(*Page 4, foot-note with '†' mark*)— Substitute the following for the existing foot-note:

'†Method for determination of colour fastness of textile materials to washing: Test 2 (*first revision*).'

Addendum

(*Page 4, clause 5.2*) - Add the following new sentence at the end of 5.2:

'The gross mass of the carton shall not exceed 50 kg.'

(TDC 25)

Reprography Unit, ISI, New Delhi, India

Indian Standard

SPECIFICATION FOR ELASTIC TAPE

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Indian Standard

SPECIFICATION FOR ELASTIC TAPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 December 1980, after the draft finalized by the Narrow Fabrics, Webbings and Braids Sectional Committee had been approved by the Textile Division Council.

0.2 This standard is based on IND/TC/2335(b) 'N.I.V. tape, elastic', issued by the Ministry of Defence, Government of India.

0.3 To familiarize the industry with the International System (SI) units, the recommended SI units for use in the textile industry are given in Appendix B.

0.3.1 The Standards of Weights & Measures Act, 1976 also stipulates use of SI units.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers knitted, woven and braided elastic tapes.

2. MATERIALS

2.1 The elastic tape shall be manufactured from the following materials:

a) *Rubber threads* — of square section, made from first grade Hevea rubber; or of round section, made from high grade rubber latex. The waste or reclaimed rubber or rubber substitute shall not be used. The rubber shall be suitably compounded and vulcanized to ensure maximum durability.

---

*Rules for rounding off numerical values (*revised*).

b) *Textile yarn* — from good quality cotton, rayon, nylon or any other suitable synthetic fibre. It shall be bleached/white or dyed to the required shade, as stipulated in the contract or order. Sulphur dyes shall not be used.

3. MANUFACTURE

3.1 The tape should be knitted, woven or braided uniformly. The rubber threads should be of uniform size and quality and should be equally spaced across the width of the tape. The tape should be of uniform width.

3.2 The elastic tape should be free from knitting, weaving, braiding or other manufacturing defects. When laid on a flat surface without any tension, the tape shall not assume a cockled or curved position.

4. REQUIREMENTS

4.1 Length — Unless specified otherwise in the contract or order, the tape shall be supplied in lengths of 5 m or multiples thereof. Each length, when measured in accordance with IS: 1954-1969*, shall be not less than that declared.

4.2 Width — When measured in accordance with IS: 1954-1969*, the width of the tape shall be as specified in the contract or order. A tolerance of ±10 percent, worked out to the nearest millimetre, shall however be permitted.

NOTE — The usual widths of the tape range from 6 to 51 mm.

4.3 Thickness — When measured in accordance with IS:7702-1975†, the thickness of the knitted tape shall be 1·0 ± 0·1 mm and of the woven and braided tapes shall be 1·3 + 0·1 mm.

4.4 Stretch Tests — The elastic tape, when tested as given in Appendix A, shall meet the requirements laid down in **4.4.1** and **4.4.2**.

4.4.1 *Before Ageing*

4.4.1.1 *Extension* — The load per centimetre width required to produce an extension of 50 percent in the tape, determined as in **A-6**, shall be between 350 and 700 gf.

4.4.1.2 *Limit of useful extension* — The limit of useful extension, determined as in **A-6**, shall be 120 percent, *Min.*

4.4.1.3 *Tension decay under constant stretch* — The decay in tension under constant stretch, determined as in **A-7**, shall not exceed 5 percent.

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*Methods for determination of length and width of fabrics (*first revision*).

†Method for determination of thickness of woven and knitted fabrics.

4.4.1.4 *Fatigue test* — When stretched and relaxed 500 times as given in **A-8**, there shall be no sign of rupture of any of the rubber threads.

4.4.2 *After Accelerated Ageing*

4.4.2.1 *Extension* — The load per centimetre width required to produce an extension of 50 percent in the tap, determined as in **A-6**, shall be not less than 75 percent of the load required to produce that extension before ageing.

4.4.2.2 *Tension decay under constant stretch* — The decay in tension under constant stretch, determined as in **A-7** (*see* Note under **4.4.2.3**), shall not exceed 10 percent. There shall also be no sign of rupture of any of the rubber threads.

4.4.2.3 *Fatigue test* — When stretched and relaxed 300 times as given in **A-8** (*see* Note), there shall be no sign of rupture of any of the rubber threads.

NOTE — For the purpose of tension decay and fatigue tests on the aged specimens, the limit of useful extension shall be taken to be the same as that determined on the specimens before ageing.

4.5 Colour Fastness — The tape shall also meet the following colour fastness requirements:

Colour fastness to	*Requirement*	*Method of Test*
a) light	5 or better	IS:2454-1967*
b) washing	5	IS:3361-1965†

4.6 Sealed Sample — If in order to illustrate or specify the general appearance, finish and such other characteristics, a sample of the tape has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

4.6.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

5. PACKING

5.1 Each length of tape (*see* **4.1**) shall be rolled over cardboard tube of minimum 2·5 cm diameter.

5.2 The rolls prepared as in **5.1** shall be wrapped individually in polyethylene film having a thickness of minimum 40 µm (*see* IS : 2508-1977‡) or waterproof packing paper (*see* IS: 1398-1968§). A suitable number of such rolls shall then be packed in a carton.

---

*Method for determination of colour fastness of textile materials to artificial light (xenon lamp).

†Method for determination of colour fastness of textile materials to washing: Test 2.

‡Specification for low density polyethylene films (*first revision*).

§Specification for packing paper, waterproof, bitumen-laminated (*first revision*).

6. MARKING

6.1 Each roll of elastic tape shall bear a label in a secured manner, marked legibly with the following:

a) Name of the material,
b) Length (m or cm) and width (mm) of tape;
c) Name or trade-mark of the manufacturer;
d) Date of packing, in suitable code; and
e) Any other information required by the buyer.

6.1.1 The elastic tape rolls may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution

6.2 Each carton shall be marked with the number of rolls contained in it in addition to the information given in **6.1**.

7. SAMPLING

7.1 Lot — The quantity of elastic tape of the same type and width in a consignment shall constitute a lot.

7.2 Unless specified otherwise in the contract or order, the sampling plan given in Table 1 shall be followed.

TABLE 1 SAMPLE SIZE AND PERMISSIBLE DEFECTIVES

(*Clauses* 7.2 *and* 7.2.2)

LOT SIZE (NO OF ROLLS)	SAMPLE SIZE (FOR LENGTH, WIDTH AND THICKNESS)	PERMISSIBLE NO OF DEFECTIVE ROLLS IN RESPECT OF TESTS ON SAMPLE ROLLS	SUB-SAMPLE SIZE (FOR STRETCH TESTS AND COLOUR FASTNESS)	PERMISSIBLE NO. OF DEFECTIVE ROLLS IN RESPECT OF TESTS ON SUB-SAMPLE ROLLS
(1)	(2)	(3)	(4)	(5)
Up to 100	8	0	3	None
101 to 300	13	1	4	
301 to 500	20	2	5	
501 to 1 000	32	3	7	
Above 1 000	50	5	10	

7.2.1 Rolls shall be selected at random. To ensure randomness of selection, IS:4905-1968* may be followed.

7.2.2 Sub-sample rolls specified in col 4 of Table 1 may be drawn from the sample rolls selected according to col 2 of the table.

APPENDIX A

(*Clause* 4.4)

METHODS FOR STRETCH TESTS

A-1. GENERAL

A-1.1 The stretch tests shall be performed on specimens as taken from the lot and also on those which have undergone accelerated ageing as prescribed in **A-3**.

A-2. PREPARATION AND MARKING OF SPECIMENS

A-2.1 The samples of elastic tape from which the test specimens are to be taken shall be allowed to relax for not less than 4 days after removal from the last manufacturing or finishing process or other source of substantial tension. They shall then be repeatedly stretched 12 times to the point of greater resistance in a period of not more than 1 minute. This treatment shall be followed by conditioning them, in completely relaxed state, for 1 hour in standard atmosphere (65 ± 2 percent relative humidity and 27 ± 2°C temperature) (*see also* IS:6359-1971†).

A-2.2 A distance of 100 mm shall be marked centrally on each specimen. The length of each specimen shall be such that, when mounted in the testing apparatus, there shall be a distance of 75 mm between each end of the marked length and the fixing points. The distance between the two gauge marks shall form the basis of stretch measurements.

A-3. METHOD FOR ACCELERATED AGEING

A-3.1 The specimens which are to be tested after ageing shall be heated in a dark, electrically heated air-oven at a temperature of 70 ± 1°C for not less than 4 days (96 hours) under the conditions prescribed in **A-3.1.1**.

A-3.1.1 The total volume of the specimens shall not exceed 5 percent of the air space of the oven. The air shall circulate freely on both sides of the specimens which may be achieved by forced circulation of the air around suspended specimens or by mounting the specimens on a cage which can be revolved in the oven. The oven shall be so ventilated that the air changes completely about 3 times an hour.

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*Methods for random sampling.

†Method for conditioning of textiles.

A-4. CONDITIONING OF AGED SPECIMENS

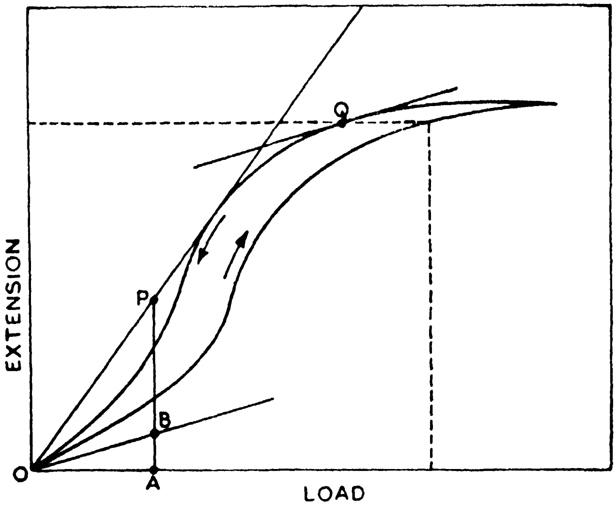
A-4.1 After removal from the oven, the specimens shall be conditioned, in completely relaxed state, for 24 hours in standard atmosphere (65 ± 2 percent relative humidity and 27 ± 2°C temperature) (*see also* IS:6359-1971*).

A-5. ATMOSPHERIC CONDITIONS FOR TESTING

A-5.1 The stretch tests shall be conducted in standard atmosphere (65 ± 2 percent relative humidity and 27 ± 2°C temperature).

A-6. DETERMINATION OF LOAD REQUIRED FOR 50 PERCENT EXTENSION AND LIMIT OF USEFUL EXTENSION

A-6.1 The specimen shall be subjected to successive 50 gf increments of load per centimetre width until it is stretched to the point of greater resistance. The specimen shall then be allowed to retract up to the point of zero tension by similar successive decrements of load. The load changes shall be made at intervals of 1 minute and stretch measurements taken at the end of each such interval. From the data so obtained, the extension and the retraction curves shall be plotted on any convenient scale as shown in Fig. 1.



$AB = \frac{1}{5} AP$

FIG. 1 HYSTERESIS CURVE

Method for conditioning of textiles.

A-6.2 The load required for 50 percent extension shall be read from the extension curve.

A-6.3 The limit of useful extension shall be determined from the retraction curve as follows:

a) Draw a tangent to the retraction curve from the origin *O*.

b) From any convenient point *P* on this tangent, draw a perpendicular to the load axis at *A*, and mark off on it a height *AB* equal to one-fifth of the height *AP*.

c) Draw a straight line through *O* and *B* and then draw a second tangent to the retraction curve parallel to *OB*.

d) Read off the extension at the point of contact *Q* of the second tangent. The value so obtained shall be taken as the limit of useful extension.

A-7. DETERMINATION OF TENSION DECAY UNDER CONSTANT STRETCH

A-7.1 The load W_1 required to stretch the specimen to 75 percent of its useful extension (*see* **A-6**) shall be determined. The specimen shall then be kept stretched at this extension for a period of 18 hours. At the end of this period, the load W_2 required to produce this extension shall be determined. The percentage tension decay shall then be calculated as follows:

$$\text{Tension decay, percent} = \frac{W_1 - W_2}{W_1} \times 100$$

A-8. FATIGUE TEST

A-8.1 The specimen shall first be so mounted that it is at zero tension but not slack, and shall then be repeatedly stretched and relaxed between the points corresponding to zero tension and limit of useful extension for the specified number of times, at a rate of 60 to 100 oscillations per minute. At the end of this operation, the specimen shall be allowed to relax freely for 1 hour and then examined for any sign of rupture of the rubber threads.

APPENDIX B

(*Clause* 0.3)

RECOMMENDED SI UNITS FOR TEXTILES

Sl No.	Characteristic	SI Unit		Application
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
1)	Length	Millimetre	mm	Fibres
		Millimetre, centimetre	mm, cm	Samples, test specimens (as appropriate)
		Metre	m	Yarns, ropes, cordage, fabrics
2)	Width	Millimetre	mm	Narrow fabrics
		Centimetre	cm	Other fabrics
		Millimetre, centimetre	mm, cm	Samples, test specimens (as appropriate)
		Centimetre, metre	cm, m	Carpets, druggets, *DURRIES* (as appropriate)
3)	Thickness	Micrometre (micron)	μm	Delicate fabrics
		Millimetre	mm	Other fabrics, carpets, felts
4)	Linear density	Tex	tex	Yarns
		Millitex	mtex	Fibres
		Decitex	dtex	Filaments, filament yarns
		Kilotex	ktex	Slivers, ropes, cordage
5)	Diameter	Micrometre (micron)	μm	Fibres
		Millimetre	mm	Yarns, ropes, cordage
6)	Circumference	Millimetre	mm	Ropes, cordage

(*Continued*)

RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

SL No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
7)	Threads in fabric			Woven fabrics (as appropriate)
	a) Lengthwise	Number per centimetre	ends/cm	
		Number per decimetre	ends/dm	
	b) Widthwise	Number per centimetre	picks/cm	
		Number per decimetre	picks/dm	
8)	Warp threads in loom	Number per centimetre	ends/cm	Reeds
9)	Stitches in knitted fabric			Knitted fabrcis (as appropriate)
	a) Lengthwise	Courses per centimetre	courses/cm	
		Courses per decimetre	courses/dm	
	b) Widthwise	Wales per centimetre	wales/cm	
		Wales per decimetre	wales/dm	
10)	Stitch length	Millimetre	mm	Knitted fabrics, made-up items
11)	Mass per unit area	Grams per square metre	g/m^2	Fabrics
12)	Mass per unit length	Grams per metre	g/m	Fabrics
13)	Twist	Turns per centimetre	turns/cm	Yarns, ropes, cordage (as appropriate)
		Turns per metre	turns/m	
14)	Test or gauge length	Millimetre, centimetre	mm, cm	Fibre, yarn and fabric specimens (as appropriate)

(*Continued*)

RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

SL No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
15)	Breaking load	Millinewton	mN	Fibres, delicate yarns (individual or skeins)
		Newton	N	Strong yarns (individual or skeins), ropes cordage, fabrics
16)	Breaking length	Kilometre	km	Yarns
17)	Tenacity	Millinewton per tex	mN/tex	Fibres, yarns (individual or skeins)
18)	Twist factor or twist multiplier	Turns per centimetre × square root of tex	turns/cm $\times\sqrt{\text{tex}}$	Yarns (as appropriate)
		Turns per metre × square root of tex	turns/m $\times\sqrt{\text{tex}}$	
19)	Bursting strength	Newton per square centimetre	N/cm^2	Fabrics
20)	Tear strength	Millinewton, newton	mN, N	Fabrics (as appropriate)
21)	Pile height	Millimetre	mm	Carpets
22)	Pile density	Mass of pile yarn in grams per square metre per millimetre pile height	$\text{g/m}^2\text{/mm}$ pile height	Pile carpets
23)	Elastic modulus	Millinewton per tex per unit deformation	mN/tex/ unit deformation	Fibres, yarns, strands

INDIAN STANDARDS
ON
NARROW FABRICS, WEBBINGS AND BRAIDS

IS:

1718-1970	Cotton spindle tapes (*first revision*)
1740-1977	Flat cotton wicks (*first revision*)
1895-1970	Cotton tape *NEWAR*, grey or dyed (*first revision*)
1923-1973	Cotton selvedge tape for electrical insulation purposes (*second revision*)
1974-1971	Cotton spindle tapes for jute textile mills (*first revision*)
2847-1964	Cotton selvedge tape for electric cables
4778-1968	Cotton laces for footwear
5351-1975	Woven polyester tape for electrical purposes (*first revision*)
5352-1974	Glass-fibre woven tape for electrical purposes (*first revision*)
5354-1969	Cotton stripping tape for electrical purposes
5656-1970	Cotton braids for sleevings
6117-1977	Tapes, cotton (*first revision*)
6487-1972	Cotton tape, unproofed and proofed, for ammunition purposes
6488-1975	Cotton webbing for personal web equipment (*first revision*)
6672-1972	Mercerized cotton tapes for berets
6673-1972	Waxed cotton selvedge tape
6674-1972	Cotton webbing for use in packing aero-engines
7284-1973	Coarse cotton webbings
7298-1973	Cotton webbings, proofed and unproofed
7426-1974	Special cotton webbings
7427-1974	Cotton webbing for ammunition carriers and other similar purposes
7776-1975	Silk webbing
7777-1975	Cotton webbing, rolled edges
8302-1977	Braided tape for berets
8894-1978	Cotton tapes for slide fasteners
9686-1980	Woven cotton tapes, light, medium and heavy qualities elastic tape

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Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31 **Telegrams : Manaksanstha**

Regional Offices:

			Telephone
Western	Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
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